

### **Remarks**

Claims 73-88, 90-124, 126, and 127 were pending in the present application prior to the present Amendment After Final. Claims 73, 75, 82-84, 93, 94, and 109-126 have been canceled herein. Claims 74, 76-81, 85-88, 90-92, 95-108, and 127 are therefore currently pending.

In the present Amendment After Final, the claims have been amended in order to place them in condition for allowance or in better form for appeal. The amendments made to claim 74 are in response to the new grounds of rejection set forth in the Office Action dated August 20, 2009, and the Applicant therefore did not have the opportunity to present them earlier. The remaining amendments have been made in order to change the dependency of the claims in view of the cancellation of claim 73, from which such claims previously depended. In view of this, the Applicant respectfully submits that the present amendments are in compliance with 37 CFR § 1.116 (b) and MPEP § 714.12.

No new matter has been added to this application by the amendments made herein, with support being found in the specification, claims and figures as filed. Support for a metallic layer disposed between a thermoplastic inner layer and one or more outer polymeric layers in amended claim 74 can be found, for example, on page 6, lines 23 to 26 and page 30, lines 21 to 23. Claim 74 has also been amended to state that the inner and outer surfaces of the pipe are non-contoured, with support for this amendment being provided by Figure 1 and page 32, lines 20 to 21.

In view of the foregoing, the Applicant respectfully requests entry of this Amendment After Final and consideration of the present application as amended herein.

### **Double Patenting**

Claims 74-75 and 85-87 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 31-35 and 37 of copending Application No. 11/458,927. The Applicant will address this ground of rejection once allowable claims have been found in that case or in the present application.

**Rejections under 35 U.S.C. § 102(b)****Claims 73, 76, 77, 85-88, 90, 91, and 94**

Claims 73, 76, 77, 85-88, 90, 91, and 94 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,131,614 to Eastham. Claims 73 and 94 have been canceled herein, making this ground of rejection moot with respect to these claims. In addition, claims 76, 77, 85-88, 90, 91 have been amended so as to depend directly or indirectly from claim 74, which has not been rejected under 35 U.S.C. § 102(b). In view of the foregoing, the Applicant respectfully requests that the rejection of claims 73, 76, 77, 85-88, 90, 91, and 94 under 35 U.S.C. § 102(b) be withdrawn.

**Rejections under 35 U.S.C. § 103****Claims 73, 75-77, 85-88, 90, 91, 108, 124, 126, and 127**

Claims 73, 75-77, 85-88, 90, 91, 108, 124, 126, and 127 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication No. 2002/0007861 to Hansen in view of U.S. Patent No. 6,131,614 to Eastham. Claims 73, 75, 124 and 126 have been canceled herein, making this ground of rejection moot with respect to these claims. The remaining claims rejected on this ground now depend directly or indirectly from claim 74.

The pipes of the present invention, as recited in claim 74, have a number of advantages which are not disclosed in the prior art of record. For example, the thin metallic layer provides useful barrier properties, while the pipe is readily bendable (page 27, lines 29 to 30). The use of a contoured metallic layer provides improved adhesion with the other layers, when compared to a non-contoured barrier layer, and provides a mechanical interlock therewith (page 33, lines 13 to 17). In addition, the pipes of the invention are intended for use in conveying fluidic material, such as a gas, liquid or slurry (page 6, lines 18 to 20). Providing a smooth inner surface prevents build up of residue from the fluid in the contours of the inner surface, of importance when conveying liquid

or slurry. A smooth outer surface can assist on-site installation, for example where a pipe of the invention is inserted into a trench or tunnel. The skilled person would therefore understand that the pipes of the present invention provide significant advantages over the prior art.

The multilayer pipe of claim 74 is inventive over the Hansen reference because Hansen does not disclose a multilayer pipe with a convoluted and seamless metallic barrier layer of 0.01 to 10  $\mu\text{m}$  thickness. Hansen also does not disclose that the inner layer of the pipe comprises at least one polar stabilizer, and filler with pendant polar functional groups or thermoplastic polymer with pendant polar functional groups. Instead, Hansen discloses a metal-plastic multilayer pipe with a plastic inner pipe and a metal sheath around the inner pipe. The pipe also has a further practical plastic outer layer. The metal sheath is formed by placing a metal layer around the inner layer of the pipe and welding the borders (page 4, left column, lines 19 to 22).

The skilled person would understand that it is not practical to seam weld layers of less than 0.2 mm, in particular since this would be likely to result in imperfections in the weld that could allow leakage through the weld, compromising the desired barrier properties. Thus, a pipe made using the method of Hansen would have a seamed metal layer of at least 0.2 mm thickness. Hansen therefore teaches away from the pipes of the present invention, which have seamless metal barrier layers of 0.01 to 10  $\mu\text{m}$  in thickness.

Hansen also uses smooth (non-contoured) layers and indicates that adhesion of the smooth metal layer to the inner layers in its pipes is so great that it imposes "form stability" on the inner layer (page 4, lines 31 to 34), such that the skilled person would not consider any other barrier layer geometry. Also, there is no teaching in Hansen regarding polar components in the inner plastic layer. In view of the foregoing, one of skill in the art would not arrive at the pipes of claim 74 from the teaching of the Hansen reference.

The Eastham reference is cited by the Examiner as teaching the deposition of a thin seamless metal barrier layer onto an inner layer of plastic. Eastham, however, discloses convoluted plastic protective sleeves, which are used to protect wires or pipes, for example in an engine compartment, from heat. Such sleeves provide protection from

heat, such as by providing a physical barrier and insulating layer around the protected wires or pipes (Eastham, column 1, lines 25 to 28). The protective sleeve comprises a wall made of heat resistant plastic, and additional heat protection is provided by deposition of a thin metal layer that reflects infra-red radiation (column 1, lines 46 to 49). The protective sleeve is located on the outside of the wall, as would be expected, since the presence of an infra-red absorbing plastics layer outside the metal layer would reduce or negate its effectiveness.

The products of the Eastham patent are thus intended for use in protecting pipes or wires from heat. This is a very different application from that of Hansen, which provides pipes for use in conveying water, where the metal layer provides an oxygen diffusion barrier. The Hansen and Eastham references thus represent different technical fields, and one of skill in the art would not consider Eastham alongside Hansen, for example because protective sleeves for conveying water would not generally be suitable for use in engine compartments.

Moreover, Eastham teaches a convoluted plastic protective sleeve with a metal layer deposited outside the main plastic tube. The sleeve is intended to protect the contents of its internal cavity from heat, with metal on the outside of the main tube wall to reflect infra-red radiation. The convolutions are present to provide heat protection, with the convolutions providing an air barrier and greater distance between the content of the cavity and heat source than a smooth sleeve made from a similar amount of metal and plastic. The convolutions are present on all layers, including the inner and outer surfaces of the tube. If Eastham were to be combined with Hansen, the combined teaching would provide a pipe with an external metal barrier layer, which may be convoluted and/or coated with a thin lacquer material that is substantially transparent to infra-red radiation, such as silicon monoxide (Eastham, column 3, lines 26 to 37). No other barrier layer is disclosed in Eastham. This would not provide a pipe of the present invention, since the outer layer would be convoluted and the outer layer would not be a polymer.

In view of the foregoing, the Applicant respectfully submits that the Hansen and Eastham references do not render claim 74 obvious. Claims 76, 77, 85-88, 90, 91, 108, and 127 depend from claim 74, and therefore are nonobvious for the foregoing reasons, in addition to containing independently patentable subject matter. The Applicant therefore

respectfully requests that the rejection of claims 73, 75-77, 85-88, 90, 91, 108, 124, 126, and 127 under 35 U.S.C. § 103(a) be withdrawn.

Claims 74, 78-80, and 82-84

Claims 74, 78-80, and 82-84 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication No. 2002/0007861 to Hansen in view of U.S. Patent No. 6,131,614 to Eastham and U.S. Patent Publication No. 2002/0082352 to Schmitz. Claim 74 is patentable over the Hansen and Eastham references for the reasons given above. With regard to Schmitz, this reference relates to a multilayer composite in which a polyamide layer is joined to a polyolefin layer by a bonding agent. Schmitz however provides no teaching in relation to barrier layers, much less seamless metallic barrier layers of thickness 0.01  $\mu\text{m}$  to 10  $\mu\text{m}$ , as recited in claim 74. In view of this, the Hansen, Eastham, and Schmitz references do not in combination render claim 74 obvious.

One of skill in the art also would not seek to combine the Schmitz and Hansen references. Hansen relates to a metal-cross linked polyethylene (PEX) multilayer pipe, and makes no mention of the use of an additional adhesive or use of other plastics, such as polyamide. The skilled person would thus have no reason to combine the teaching of these two patents, which relate to different fields of technology.

Claims 78-80, and 82-84 depend directly or indirectly from claim 74, and therefore are patentable for the reasons given above. In view of this, the Applicant respectfully submits that claims 74, 78-80, and 82-84 are patentable over the Hansen, Eastham, and Schmitz references, and requests that the rejection of these claims under 35 U.S.C. § 103(a) be withdrawn.

Claims 81 and 92-107

Claims 81 and 92-107 were rejected under 35 U.S.C. § 103(a) as being unpatentable over one or more of U.S. Patent Publication No. 2002/0007861 to Hansen, U.S. Patent No. 6,131,614 to Eastham, and U.S. Patent Publication No. 2002/0082352 to

Schmitz, in combination with one or more of the following references: European Patent No. 793 045 to Guest; Japanese Patent Application No. 59155010 to Hibino; US Patent No. 4,305,994 to Murase; US Patent No. 5,730,922 to Babb; U.S. Patent No. 5,132,344 to Matteodo; U.S. Patent No. 5,416,142 to Bush; U.S. Patent No. 4,454,258 to Kawahara; U.S. Patent No. 6,465,543 to Alexandre; U.S. Patent No. 3,721,597 to Colburn.

The foregoing additional references do not supply the deficiencies noted above with respect to the Hansen, Eastham, and Schmitz references. The Applicant also affirms the contentions made with respect to these references in the Amendment dated May 29, 2009. In view of the foregoing, the Applicant therefore respectfully requests that the rejection of claims 81 and 92-107 under 35 U.S.C. § 103(a) over the foregoing references be withdrawn.

### **Conclusion**

The Applicant believes that all pending claims presently under consideration, claims 74, 76-81, 85-88, 90-92, 95-108, and 127, are in condition for allowance. If, however, there remain any issues which can be addressed by telephone, the Examiner is encouraged to contact the undersigned at the telephone number listed below.

Please charge any fee due in connection with the present Amendment After Final, or credit any overpayment, to Deposit Account No. 19-2090.

Respectfully submitted,

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